Teacher Labor Markets in Developed Countries

Helen F. Ladd

Summary

Helen Ladd takes a comparative look at policies that the world's industrialized countries are using to assure a supply of high-quality teachers. Her survey puts U.S. educational policies and practices into international perspective.

Ladd begins by examining teacher salaries—an obvious, but costly, policy tool. She finds, perhaps surprisingly, that students in countries with high teacher salaries do not in general perform better on international tests than those in countries with lower salaries. Ladd does find, however, that the share of underqualified teachers in a country is closely related to salary. In high-salary countries like Germany, Japan, and Korea, for example, only 4 percent of teachers are underqualified, as against more than 10 percent in the United States, where teacher salaries, Ladd notes, are low relative to those in other industrialized countries.

Teacher shortages also appear to stem from policies that make salaries uniform across academic subject areas and across geographic regions. Shortages are especially common in math and science, in large cities, and in rural areas. Among the policy strategies proposed to deal with such shortages is to pay teachers different salaries according to their subject area. Many countries are also experimenting with financial incentive packages, including bonuses and loans, for teachers in specific subjects or geographic areas.

Ladd notes that many developed countries are trying to attract teachers by providing alternative routes into teaching, often through special programs in traditional teacher training institutions and through adult education or distance learning programs. To reduce attrition among new teachers, many developed countries have also been using formal induction or mentoring programs as a way to improve new teachers' chances of success.

Ladd highlights the need to look beyond a single policy, such as higher salaries, in favor of broad packages that address teacher preparation and certification, working conditions, the challenges facing new teachers, and the distribution of teachers across geographic areas.

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Despite differences in their histories, cultures, and economies, all industrialized countries face the challenge of how to ensure a supply of high-quality teachers sufficient to meet demand. The demand for teachers differs from one country to the next primarily because of differences in the number of school-age children and in politically determined pupil-teacher ratios. Demand also varies with the ambitiousness of a country's educational aspirations. My focus in this article, however, is not on differences in demand but rather on the policies that countries use to affect the supply of teachers—namely, the level and structure of teacher salaries, financial incentives to recruit teachers to areas of shortage, and entry requirements into the teaching profession. For simplicity I define industrialized countries as the thirty member nations of the Organization for Economic Cooperation and Development (OECD) and draw heavily on a recent major OECD study of teacher recruitment and development.[1] Although this analysis generates no simple policy lessons for the United States, it does provide perspective on a variety of matters, including the fact that the United States pays its teachers less generously than many other industrialized countries.

Teacher Salaries and Teacher Shortages

Salaries are one of the most obvious, but costly, policy tools available to governments in their quest to ensure a supply of high-quality teachers. Because teacher salaries are such a large share of the education budget—about 64 percent in the OECD countries—any across-the-board increase in teacher salaries can translate into significant increases in education spending. But when a country does not pay salaries high enough to attract high-quality teachers, it must either face vacancies or rely on teachers who, based on the stated standards, are underqualified.

Comparing Teacher Salaries across Countries

In many countries, teacher salaries are determined by a national bargaining process between the government and one or more unions. In the United States, in contrast, salary setting is far more decentralized. Therefore any simple comparison of salaries in other countries with those in the United States does not take into account the large variation in U.S. salaries from one school district to another.[2]

By almost any measure, Germany, Japan, and Korea pay generous salaries to their teachers relative to other counties, including the United States. But the relative ranking of U.S. salaries varies with the measure used. For example, a comparison of absolute salaries (adjusted for differences in purchasing power across countries) finds the United States in the top third of OECD countries. In 2003 its average salary for mid-career teachers in lower secondary schools was $43,999—exceeded only by Luxembourg at $80,520, Switzerland at $58,520, Germany at $48,804, Korea at $46,516, and Japan at $45,515. Also in the top ten by this absolute measure are Scotland, the Netherlands, Australia, and England.[3]

But measuring teacher salaries relative to a country's gross domestic product (GDP) per capita puts the United States in the bottom third (see table 1). By that measure, at 117 percent of GDP per capita, the average salary paid to U.S. teachers is on a par with those in Italy and Austria and far below those of Korea (242 percent), Germany (180 percent), and Japan (160 percent). Countries such as

Table 1. OECD Countries Ranked by Ratio of Teacher Salaries to GDP per Capita, 2003

Highest third		Middle third		Lowest third	
Country	Ratio	Country	Ratio	Country	Ratio
Korea	2.42	Netherlands	1.42	Italy	1.18
Mexico	2.23	Australia	1.40	**United States**	**1.17**
Portugal	1.81	England	1.40	Austria	1.13
Germany	1.80	Greece	1.38	Czech Rep.	1.06
Switzerland	1.80	Finland	1.29	Sweden	1.03
Japan	1.60	Belgium (Fl.)	1.28	Hungary	0.98
Spain	1.59	Belgium (Fr.)	1.24	Norway	0.96
New Zealand	1.51	Ireland	1.22	Poland	0.82
Luxembourg	1.50	Denmark	1.21	Iceland	0.73
Scotland	1.45	France	1.21	Slovak Rep.	0.56

Source: OECD, *Education at a Glance* (Paris, 2005), chart D3.1. Based on mid-career salaries of teachers in lower secondary education.

the Netherlands, England, and Finland fall in the middle third.

Though not perfect, this relative measure provides a more accurate picture of whether salaries are generous enough to attract a quality teaching force than does the absolute measure and is thus the measure I use throughout this article. Even better would be a measure of how teacher salaries compare with salaries paid for specific competing occupations, such as computer operators or librarians, but relevant data are not available on a systematic basis across countries.[4] Presumably, though, the richer a country is as measured by its GDP, the higher competing salaries are. Thus, the fact that average U.S. teacher salaries are low relative to GDP per capita indicates both that the United States has the capacity to pay higher salaries and that current salaries may not be high enough to attract a quality teaching force.

Of course, working conditions for teachers may also differ across countries. Hence, a third way of comparing salaries is to express them relative to an important measure of working conditions, such as hours of net teaching time. By this metric, U.S. salaries rank in the lowest third of twenty-seven OECD countries for high school and in the middle third for primary school. Once again, Germany, Japan, and Korea are consistently in the top third.[5]

Maintaining Teacher Supply

Of particular relevance to policymakers is whether salaries are high enough to avoid widespread teacher shortages. Though such shortages are sometimes measured in terms of vacancies, schools typically find some way to fill most positions. A better measure is the share of positions filled by teachers without full qualifications. In high-salary OECD countries such as Germany, Japan, and Korea, the share of such teachers in primary and secondary schools is low: less than 4 percent, as against more than 10 percent in countries such as Sweden and the United States, where salaries (relative to GDP per capita) are low.[6] Though Hungary and Italy are exceptions (both have low salaries and less than 4 percent underqualified teachers), higher salaries are generally

linked with a lower share of underqualified teachers.

Several studies in England and Switzerland offer more detailed analysis of how teacher salaries affect teacher supply. A careful empirical study, based on a large sample of U.K. university graduates, of the decision to become a teacher found that expected earnings in teaching relative to earnings in other occupations clearly affects the supply of new teachers, and hence that increases in teacher salaries may be a potent tool for increasing the supply of teachers.[7] A subsequent analysis of the U.K. market for teachers between 1960 and 2002 confirmed that conclusion but emphasized that the power of relative wages to affect the supply varies with the state of the labor market.[8] In particular a policy-driven increase in teacher salaries relative to those in competing professions raises the supply of teachers more when teacher salaries are relatively low than when they are high. This insight may explain an empirical finding from Switzerland that the supply of teachers is not very responsive to salaries. The weaker salary effect in Switzerland could simply reflect the fact that teacher salaries are much higher relative to other occupations there than they are in the United Kingdom.[9]

There is little doubt that uniform salaries across academic subject areas and across geographic regions can lead to shortages in certain subjects and in certain regions.

Regardless of the average relationship between teacher salaries and teacher shortages, there is little doubt that uniform salaries across academic subject areas and across geographic regions can lead to shortages in certain subjects and in certain regions. The subjects most susceptible to teacher shortages are math and science, fields in which salaries are relatively higher in occupations outside teaching. The regions most susceptible to shortages are large cities, where the costs of living are higher, where other job opportunities are plentiful for educated workers, and where teaching conditions associated with concentrations of immigrant children from impoverished families can be difficult, and rural areas, where it can be hard to attract teachers. Both types of shortages emerge in most developed countries.

Various policy strategies have been proposed, both in the United States and in other developed countries, to address these shortages. One strategy commonly proposed by economists is to pay teachers different salaries according to their subject area. Analysis for England, however, implies that although higher pay could reduce the shortage of teachers in certain subjects, the salary differences might need to be substantial, because graduates in engineering, science, and social sciences are likely to respond to an increase in wages at only half the rate of graduates of other programs.[10]

Some OECD countries use higher salaries to attract teachers to certain geographic areas. Higher salaries, for example, are offered in London both to offset the high cost of living and to compensate for the challenges of educating disadvantaged urban students. Salaries in London now exceed those in the rest of England by £2,000–£2,500, or about 12 percent. Even this difference, though, has not

lowered teacher vacancy rates and the share of teacher slots filled by substitute teachers in London enough to match rates elsewhere in England.[11]

Sweden, a country with a tradition of strong teacher unionism, also uses differential salaries.[12] In 1995, as part of its broader effort to decentralize its schooling system, Sweden modified its centrally bargained fixed-pay scheme and gave municipalities greater flexibility to tailor salaries for individual teachers. As a result, salaries are now negotiated according to teacher characteristics (for example, secondary versus primary), the labor market situation (with teachers in shortage areas able to garner higher salaries), the performance of the teacher, and the range of the teacher's responsibilities. Salaries thus now vary far more than they once did. Although evidence is still limited, the new system appears to have helped some schools overcome some teacher shortages, though the ability of a municipality to make salary adjustments depends on its own economic situation. Notably, poor municipalities can compete effectively for teachers only with the help of grants from the central government.

Teacher Salaries and Teacher Quality

Exactly how teacher salaries affect the quality, in contrast to the quantity, of teachers is not yet clear, though one careful study based on fifteen years of variation in teacher salaries across states in Australia sheds some light on the matter.[13] Using sophisticated statistical techniques, the author concludes that increases in teacher salaries relative to salaries in other occupations raise the quality of potential teachers, as measured by the test scores of students pursuing education courses at Australian universities. (Unlike U.S. university students, those in Australia and in most other OECD countries choose their career paths before they enroll in college.) One of the study's findings is that increasing relative salaries by 10 percent raises the quality of students choosing to pursue an education degree by 8 percentile ranks on their test scores. Much less clear, however, is the potential effect of a differential increase in salaries for new teachers, with higher salaries going to those at the top of the aptitude distribution.

Financial Incentive Packages to Recruit New Teachers

Some countries such as Korea and Japan, both of which feature high teacher salaries, have little difficulty recruiting teachers. In 2001 in Japan, for example, only 6–11 percent of qualified applicants, depending on the grade, were appointed as teachers. In Korea, only about 20 percent of the qualified teachers are appointed.[14] Too great a supply, however, is not necessarily a blessing. Some countries with teacher surpluses find it hard to ensure that talented young people choose to enter teaching. And surveys find that school principals in countries with a teacher surplus worry more about teacher morale and enthusiasm than do those in countries without such a surplus.[15]

Although the number of university students entering as teachers has been growing in several OECD countries, that number fell 10 percent or more between 1997 and 2001 in others, including Belgium (the French community), France, Germany, Mexico, and Scotland.[16] In efforts to attract new teachers, to improve the quality of the teachers who apply, and to recruit teachers for specific subjects or geographic areas, various countries have experimented with financial incentive packages.

The incentives available in England are illustrative. A training bursary offers a tuition

waiver and a £6,000 training grant to encourage students to enter a teacher education program. The Golden Hello provides a £4,000 bonus (more than 20 percent of a starting salary) for teachers in shortage subject areas who complete an induction program within a specified period. Student loans are also available for newly qualified teachers who voluntarily take classes in a designated shortage subject area. And Fast Track offers trainees participating in an accelerated program for highly talented graduates a grant of £5,000—£3,000 at the start of the program and £2,000 when they take up their first Fast Track teaching post. The Teach First program, which I discuss below, is specifically designed to induce graduates to enter teaching in London.

Little research is as yet available on the effectiveness of these programs. Although the number of entrants to teacher education programs has risen in England over the past few years, it is difficult to attribute the increase to any specific recruitment initiative. And some surveys have found a downside to such programs: some existing teachers and teacher candidates find it unfair that teachers newly entering the profession should be eligible for benefits that they did not get.[17]

Australia provides incentive packages primarily to attract teachers to rural areas. Because its education system is decentralized, packages vary from one state to another. For example, South Australia provides teaching scholarships of $10,000 to students from rural locations who are offered permanent employment in a rural school for a minimum of two years. In Queensland the rural area incentive scheme offers such benefits as cash, extended leave provisions, and induction programs for new teachers who commit to teach in rural areas. New South Wales has piloted a retention benefit program to attract and retain teachers in difficult-to-staff positions and schools. Starting in 2002, teachers who complete their initial service requirement of two or three years in a hard-to-staff area are paid an annual retention bonus of $5,000. Eligible teachers continue to receive the benefit for a maximum of five years. New South Wales also offers rent subsidies of up to 90 percent in certain rural areas.[18]

The salary adjustments in London and in the Australian provinces suggest the importance of providing financial benefits over an extended period. If certain geographic areas are indeed far less appealing to teachers and if the goal is not only to attract but also to retain quality teachers in those areas, the most logical incentive program is a long-term financial package rather than a one-time bonus.

Salary Structures, Working Conditions, and Teacher Attrition

A teacher's decision to enter or remain in teaching depends not only on his or her initial salary but also on the expected growth in that salary over time. A key question is what a potential teacher could expect to earn over his or her lifetime as a teacher compared with other occupations. To the extent that the potential for salaries to increase with experience in teaching is lower than it is in competing occupations, teachers might be tempted to switch jobs or to retire earlier than their counterparts in other occupations.

Salary structures vary widely across OECD countries. For teachers at the lower secondary level, the top salary exceeds the entering salary by only 10 to 20 percent in Denmark, Finland, and Norway but by more than 130 percent in Japan, Portugal, and Korea. Germany, which along with Japan and Korea has high average salaries, has a relatively narrow

salary range of only 38 percent. The high starting salaries thus grow relatively little as teachers gain experience. By comparison, top salaries in the United States exceed entry-level salaries, on average, by about 73 percent.[19] National policies also vary with respect to how long it takes a teacher to reach the top salary. In England and Scotland it takes only six years, compared with more than thirty years in eight countries, including France, Korea, and Spain.[20]

One model of teacher salary progression, as exemplified by Germany, is high starting salaries with relatively rapid growth to a salary plateau. That model is presumably most attractive to those who are willing to make a substantial initial commitment to teaching, as is required by the German system of initial teacher preparation (see below), but may not succeed in keeping teachers in the profession until the normal retirement age. Not surprisingly, the average retirement age for teachers in Germany is only 59, far below 65, the age for retirement with full benefits.[21] In 2001, only 6 percent of German teachers worked until age 65.[22] Korea exemplifies a second model, in which salaries start low but climb steadily over a long period. That model is presumably less attractive to teachers who are unsure about whether they wish to become a lifetime teacher, but it may succeed in retaining teachers as they age. In yet a third model, exemplified by England, salaries start relatively low but then rise quite rapidly to a plateau. That model is associated with the most severe challenges of retaining teachers.

A prospective teacher's decision to enter, or the decision later to stay in, the teaching profession also depends on how a country's salary structure for teachers compares with those in competing occupations—and thus how lifetime earnings compare across professions. Careful analysis of salaries over time in England, for example, finds that the expected lifetime earnings of both men and women in teaching have been declining relative to lifetime earnings of professionals in other occupations. For women in England, teaching nevertheless remains a relatively attractive career, while for men the lifetime return

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from teaching relative to other occupations is negative.[23] That negative return could well explain why men have increasingly been leaving teaching in England.[24] The departure of male teachers is of particular concern because men are overrepresented both in high schools, which are more subject to teacher shortages than primary schools, and in the shortage areas of science and math.

To counter the effects of having relatively low top salaries (only 46 percent higher than the entry salaries) that are reached at a relatively young age, England has introduced two new salary-related programs within the past ten years to retain effective teachers.

Since 2000, England and Wales have had a program that resembles National Board Cer-

tification in the United States. The program gives teachers the option of being assessed against national criteria for teaching effectiveness when they reach the top of the standard pay scale. Those who pass the assessment gain access to significantly higher pay. Unlike the more restrictive U.S. program, more than 230,000 U.K. teachers, or 80 percent of those who were eligible, applied in the first year, and 97 percent of them passed.[25] Critics argue that the process is too time-consuming, both for the applicants and for the head teachers (that is, school principals) who do the evaluation. And no evidence to date shows that the program improves teacher quality and student achievement, though that fact is not surprising because passing the threshold requires evidence of successful past, rather than current, performance. The program does, however, indicate a strong interest among teachers in higher pay and gives successful teachers access to an "upper pay scale" that offers performance pay.

Teachers in England can also increase their pay by becoming an Advanced Skills Teacher (AST). This option, introduced in 1998, keeps teachers in the classroom by allowing them to augment the top salary by up to 40 percent. Teachers can apply at any stage in their career and must pass an AST assessment based on an externally evaluated portfolio. They then typically spend up to 20 percent of their time providing support to other teachers. The hope is that ultimately ASTs will make up about 5 percent of the workforce.[26]

Such programs are not unique to England. Other OECD countries have also searched for ways to diversify a "flat" career structure that offers only limited options outside the classroom as well as limited opportunities for promotion and career diversification. A common approach is to provide opportunities for established teachers to mentor young teachers. In addition, many countries are shifting more management authority to the school level and creating new roles for teachers, including a variety of "middle management" positions such as departmental heads, team leaders, or management or curriculum development personnel. Typically these positions bring with them higher pay and reduced classroom teaching hours.[27] Nonetheless, opportunities for roles outside the classroom remain quite limited. In 2001, on average, only about 5 percent of staff positions in upper secondary schools across fourteen OECD countries were classified as management and 4 percent as professional development.[28]

Attrition and Nonsalary Considerations

Teachers in England leave the profession at far higher rates than those in many other developed countries, including the United States, where teacher attrition rates increased from 5.1 percent in the early 1990s to 7.4 percent in the late 1990s. In England the rate of attrition rose from 8 percent to 10 percent between 1999–2000 and 2001–02.[29] By contrast, in Italy, Japan, and Korea departure rates are less than 3 percent.[30] Part of the explanation for England's higher attrition rates is undoubtedly the salary structure, but concerns about salary are not the sole explanation.

Indeed, in a 2002 survey of more than 1,000 departing teachers in England, 45 percent of respondents cited the heavy workload, 36 percent cited government initiatives, and 35 percent cited stress as the most important reasons for leaving the profession.[31] Only 11 percent cited low salaries. Concerns about workloads and government initiatives were particularly prevalent among those leaving primary schools, where low ratios of teachers to pupils and the government's drive to pro-

mote literacy and numeracy have put a significant burden on teachers. Many teachers, especially older ones, appeared to be increasingly frustrated with the administrative duties associated with new government initiatives, including school testing reports and the stress of meeting performance thresholds. Although some teachers said that higher salaries might have compensated them for these heavier workloads, more than 40 percent said that nothing could induce them to stay.[32]

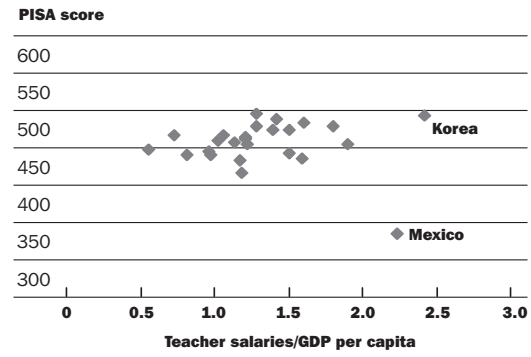
Concern about work-related stress is also evident in a recent study of teacher supply in Sweden, where the share of teachers suffering mental stress rose from 5.3 percent in 1991 to 21.1 percent in 2002, an increase far exceeding that for all Swedish employees or for white-collar workers. One plausible explanation for the rising stress among teachers is the deterioration in working conditions associated with a continuous fall in the ratio of teachers to pupils during the 1990s.[33]

The lesson for the United States is that government policies that put significant new pressure on teachers could increase departures from the profession. Further, both in the United States and internationally, it is likely to be the more qualified teachers who leave.[34]

Strategies to Retain Teachers

Nonsalary policies used by various OECD countries to try to retain effective teachers include providing additional support staff for teachers, recognizing and celebrating effective teachers, improving school leadership, and reducing teacher burnout through part-time work, sabbaticals, and extended leaves.[35] Some of these efforts appear to be useful, at least for some teachers and in some countries.

Figure 1. Program in International Student Assessment Test Scores versus Teacher Salaries



Source: Data on test scores accessed from *International Outcomes of Learning in Mathematics Literacy and Problem Solving: PISA 2003 Results from the U.S. Perspective* (http://nces.ed.gov/surveys/pisa/PISA2003HighlightsFigures.asp?figuure=9&qquest=1). Based on data for combined math literacy scores for fifteen-year-olds in twenty-four countries.

Teacher Salaries and Student Achievement

If high teacher salaries relative to GDP generate a teaching force of high-quality teachers, one might expect students in countries with high teacher salaries to perform better on international tests than those in countries with lower salaries. Although the high test scores of students in Korea and Japan appear to support the link between high salaries and high student performance, a closer look at the data gives a different picture. For example, in the combined mathematics literacy results of fifteen-year-olds from the Program in International Student Assessment (PISA) in 2003, U.S. students scored an average of 483, compared with the OECD average of 500, leaving the United States ranked twenty-fourth among the twenty-nine participating OECD countries.[36] Figure 1 shows no clear relationship between teacher salaries and PISA test scores for the twenty-five OECD countries for which data are available on both measures.[37]

The Trends in International Mathematics and Science Study (TIMSS) data present a similar

picture. The average score of U.S eighth graders on that test in 2003 was 504, well above the international average of 466, but far below the scores of Korea (589), Japan (570), Belgium–Flemish community (537), Netherlands (536), and Hungary (529). Among those five countries, the first two have high salaries; the next two, middle-range salaries; and the fifth has low salaries. Again, no clear positive link emerges between teacher salaries and student performance.[38]

The absence of a simple link between teacher salaries (relative to GDP per capita) and student achievement should come as no surprise given the many differences among these countries, including culture, the education level of the adult population, the quality of the teacher training programs, and the presence or absence of national standards. Even if a relationship had emerged from the data, the complexity of the interrelationships between all these variables would make it difficult, if not impossible, to tease out causal linkages between teacher salaries and student achievement.[39]

Teacher Preparation, Including Qualifications and Induction Programs

Though expectations about relative salaries are important to the decision to become or remain a teacher, the expected monetary rewards for teaching must be traded off against other costs or benefits of entering the profession. The main costs are two: training and the possibility of having a poor experience in the early years of teaching.

Teachers are almost always required to have a university degree. Some countries, including the United States, require an additional teaching credential. OECD countries differ not only in how many years of education they require, but also in whether they require a pre-service exam and practical classroom teaching experience. The wide variation across countries suggests a lack of consensus about how best to prepare teachers.

Length of Education Programs

As in the United States, the typical postsecondary education program for teachers is uniformly four years in Australia, Canada (Quebec), England, and Korea. In many other countries, the length differs for teachers at the primary and secondary levels, but programs tend to be longer than in the United States, particularly for high school teachers. The average across the OECD countries is 3.9 years for primary school teachers, 4.4 years for lower secondary school teachers, and 4.9 years for upper secondary teachers.[40] The general OECD trend has been to lengthen teacher education programs and to raise standards, for example by requiring graduate training for secondary school teachers.[41]

In Europe, Germany has one of the longest, most rigorous, and most inflexible programs of teacher preparation. Initial teacher education takes five years for primary teachers and at least six years for secondary teachers.[42] The first phase of the training, which lasts three to four years, takes place in universities and ends with a thesis and written and oral examinations. Upon successful completion of these examinations, students are eligible to move to the second, or preparatory service, phase, which lasts between one and a half and two years. In this phase, students work at schools at a reduced salary and participate in training seminars run by various ministries of education countrywide. Immediate enrollment in the second phase is not guaranteed, because it is subject to the availability of vacancies at the relevant training institute. At the end of this phase, candidates take an-

other state examination, which consists of another written thesis, an oral examination, and an evaluation of classroom teaching.

Only then are graduates able to enter the profession as probationary teachers. At the end of a two-year probation period, they are appointed for life, provided they are at least twenty-seven years old. Because of the long training program, the average age of teachers entering tenured employment was thirty-two in 1998. And because the training is oriented toward particular levels of schooling (primary, lower secondary, or upper secondary) and types of schools (general or vocational), teachers are not easily able to transfer from one type of teaching position to another.[43] Although reasonable people may disagree about the appropriate length and form of teacher preparation programs, one thing is quite clear. Potential teachers are likely to be willing to make such an investment only if the payoffs in terms of future salary make the effort worthwhile. Thus it is not surprising to find that the long and rigorous teacher preparation program in Germany is associated with high initial salaries.

Practical Field Experience

The general trend across OECD countries is to increase opportunities for practical classroom experience, to start the practical training earlier in the education program, to connect teacher education institutions more closely with the schools where their graduates will teach, and to broaden the scope of the experience beyond classroom teaching.[44] These changes come in response to growing dissatisfaction with having prospective teachers do their practice teaching only at the end of their education.

Teacher education in Sweden, for example, now includes a twenty- to thirty-week program in which a student works with a teacher team within a school on a wide range of professional skills and pursues a research project linked to his or her academic program. Student teachers then stay in touch with "their school" throughout their teacher education.[45] In Ireland, practical experience at the secondary level no longer focuses just on teaching but now extends to planning, supervision, and extracurricular activities. In Israel, practical field experiences now account for 15 percent of the total program time. Also, much of the fourth year of college work is devoted to work in school as regular teachers, combined with reflection with a mentor at the school and with a tutor in the college.

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The lessons emerging from the OECD countries are that practicum experience works best when there is close cooperation between the teacher training program and the schools, including some shared training of teacher educators and supervising teachers; when trainees are given opportunities to conduct research in the classroom; and when the course-based and fieldwork components are integrated.[46]

Certification of New Teachers

Some countries, such as Finland, impose no requirements on prospective teachers beyond completion of a teacher education pro-

gram. Finland can afford such a simple approach because its teacher education programs are standardized, the demand for teaching education opportunities is high, and connections between training institutions and the education profession are close. About half the OECD countries, however, have additional requirements in the form of competitive examinations and mandatory teaching experience or both, as criteria for entrance to the teaching profession.[47]

Competitive examinations are used in France, Germany, Greece, Italy, Japan, Korea, Mexico (in some states), and Spain. In some cases the exam scores determine whether one gets a teaching license; in others, scores determine who gets positions in particular schools. Both Italy and Spain also require one year of teaching. Interestingly, only one in three OECD countries, including the United States, requires teaching experience in order to receive a regular teaching license. Further, the typical U.S. three-year teaching requirement is longer than that in all other countries. Several other countries, though, call for a probationary period before a teacher can get tenure in the form of a permanent teaching post.[48]

Alternative Routes into Teaching

Faced with teacher shortages in some areas, many countries now provide alternative routes into teaching. Of twenty-five OECD countries for which information is available, seventeen make it possible for side entrants—that is, people who have pursued nonteaching careers—to enter the teaching profession. These programs last from one to three years and vary in form. The most common form, used in twelve countries, provides special programs in traditional teacher training institutions, but some offer adult education or distance learning programs. In most countries, side entrants are permitted to start teaching before they are fully qualified.

An interesting version of this program, which resembles the Teach for America Program in the United States, is England's Teach First program, which specifically addresses teacher shortages in London. A two-year program for graduates who had intended to pursue business careers, it provides intensive employment-based teacher training during the summer after graduation and additional support and training during the first year of teaching, culminating with a teaching qualification.

Among the countries that provide no alternative routes into teaching are Japan, Korea, and Scotland, all of which have relatively high teacher salaries.[49] Germany appears to be a counterexample, in that even though it pays high salaries it does have a side entrant program. But the program is quite limited, with only 3 percent of new appointees entering through that route in 2003. Moreover, though some side entrants in Germany teach in shortage areas in the general education system, such as physics and mathematics, most work in vocational areas.

Not much information is available on the extent to which these programs are used in various countries or on how successful they are at attracting and retaining teachers. In general, the side entrant programs appear to be more a response to the need for teachers than a general movement toward greater flexibility in the teaching profession.

Induction and Mentoring Programs

Beginning teachers in all countries tend to be overwhelmed and to struggle with classroom management and other problems.[50] Increasingly, developed countries have been using formal induction or mentoring programs as a

Table 2. Formal Induction Programs for Beginning Teachers, Selected OECD Countries, 2004

Mandatory (1 year)	Varies (by school)	Not offered
England and Wales	Australia	Austria
France	Canada	Belgium (Fl.)
Greece (8 months)	Denmark	Belgium (Fr.)
Israel	Netherlands	Chile
Italy	Sweden	Finland
Japan	**United States (by district)**	Germany*
Korea (7 months)		Hungary
Northern Ireland		Ireland
Scotland		
Switzerland (2 or 4 weeks over 2 years)		

Source: OECD, *Teachers Matter: Attracting, Developing and Retaining Effective Teachers* (Paris, 2005). *In Germany, the induction program is part of the final year of initial teacher education.

way to improve beginning teachers' chances of success and thereby to reduce the rate of teacher attrition. This trend is consistent with research literature that shows positive benefits not only for the novice teachers but also for the mentors.[51]

Nonetheless not all countries have such programs. Of the OECD countries listed in table 2, ten have national mandatory induction programs, the majority of which last a year. Six countries have such programs in some schools or, in the case of the United States, some districts. In the United States only twenty-three states require some form of mentorship or induction program, and those programs are generally designed and controlled at the local level.[52] Eight countries have no formal induction program. Note, though, that while Germany is included in this group, it does include an induction program in its basic teacher preparation program.

Scotland appears to have one of the more generous induction programs. It guarantees a one-year teaching post to any eligible student who has graduated with a teaching qualification from a Scottish institution of higher education and sets a maximum teaching load of 70 percent, with the rest of the time set aside for personal development. When new teachers apply for a teaching position, they are asked to rank the five local authorities in which they would most like to work. If they are assigned to and accept a position outside their top five authorities, they are eligible for a location bonus of £6,000. Thus, the program is being used not only to make beginning teachers more successful but also to reduce teacher shortages.[53] Beginning in 1999, England introduced a statutory induction period of one year for newly qualified teachers. In contrast to the Scottish program, however, the English program frees up only 10 percent of the teaching time for personal development.

Conclusion

Because of their divergent histories, cultures, values, and economic situations, industrialized countries have developed a wide range of policies related to the supply of teachers. Although it is not possible to derive any simple policy lessons for the United States from

this complicated mix, the international experience is useful for providing perspective on the U.S. situation and for generating potential strategies to deal with specific issues. These strategies, however, require more study and formal evaluation.

The clearest finding of this review is that salaries are quite low in the United States relative to those in other developed countries. Although this may well mean that higher salaries would be desirable, the evidence also shows no clear relationship across countries between teacher salaries and student achievement. Moreover, the review highlights the importance of looking beyond single policy levers in favor of broader policy packages. Higher salaries alone, for example, without attention to the nature of teacher preparation and certification, working conditions, the challenges facing new teachers, and the distribution of teachers across geographic areas, are unlikely to elicit the desired widespread improvements in student achievement.

Notes

1. See OECD, *Teachers Matter: Attracting, Developing and Retaining Effective Teachers* (Paris, 2005), and the background reports for individual countries on which the report was based. This OECD project represents the most comprehensive analysis to date of teacher policies at an international level. OECD member countries are listed in table 1.

2. A similar averaging problem arises for other countries, such as Australia, that also have relatively decentralized education systems.

3. OECD, *Education at a Glance: OECD Indicators 2005* (Paris, 2005), table D3.1, p. 370. All figures are converted to U.S. dollars using purchasing power parity.

4. One exception is a comparison of the salaries of secondary school teachers with other public sector employees across a number of OECD countries in 1999. That analysis shows that with a few exceptions, teacher salaries are the same as or higher than those for computer operators, librarians, and social workers. In contrast, secondary school teachers receive lower salaries than university lecturers and civil engineers in most countries, except in Australia, Germany, and Luxembourg, where they are comparable. See OECD, *Teachers Matter* (see note 1), table 3.2., p. 76.

5. OECD, *Education at a Glance* (see note 3), chart D3.1, p. 370. Information is missing for England, Mexico, Sweden, and Switzerland at the high school level; and for England, Sweden, and Switzerland at the primary level.

6. OECD, *Teachers Matter* (see note 1), table 3.1, p. 48.

7. Peter Dolton, "The Economics of UK Teacher Supply: The Graduate's Decision," *Economic Journal* 100 (1990): 91–104.

8. Arnaud Chevalier, Peter Dolton, and Steven McIntosh, "Recruiting and Retaining Teachers in the U.K.: An Analysis of Graduate Occupation Choice from the 1960s to the 1990s," *Economica* (forthcoming).

9. S. Wolter and S. Denzler, "Wage Elasticity of the Teacher Supply in Switzerland," Discussion Paper 733 (Bonn: Institute for the Study of Labor, 2003), as cited in OECD, *Teachers Matter* (see note 1), p. 70.

10. Chevalier, Dolton, and McIntosh, "Recruiting and Retaining Teachers in the U.K." (see note 8), p. 28.

11. For data on vacancy rates in London, see Alistair Ross and Merryn Hutchings, *Attracting, Developing and Retaining Effective Teachers in the United Kingdom of Great Britain and Northern Ireland: OECD Background Report* (Paris, March 2003), para. 157, p. 33.

12. The following discussion is based on OECD, *Teachers Matter* (see note 1), pp. 146 and 147.

13. Andrew Leigh, *Teacher Pay and Teacher Aptitude,* Australian National University, Manuscript, November 2005.

14. OECD, *Teachers Matter* (see note 1), p. 60.

15. Ibid., p. 60.

16. Ibid., p. 52.

17. Ibid., p. 53.

18. Ministerial Council on Education, Employment, Training, and Youth Affairs (MCEETYA), *Demand and Supply of Primary and Secondary Teachers in Australia* (Melbourne, Victoria, 2004).

19. OECD, *Education at a Glance* (see note 3), table D3.1, p. 369.

20. OECD, *Teachers Matter* (see note 1), figure 6.4, p. 181.

21. Ibid., table 6.3, p. 175.

22. Ibid., p. 202.

23. Peter J. Dolton, "Teacher Supply," in *Handbook of the Economics of Education*, edited by E. A. Hanushek and F. Welch (forthcoming).

24. Peter Dolton, A. Tremayne, and T. Chung. "The Economic Cycle and Teacher Supply," paper commissioned for the OECD Activity, "Attracting, Developing and Retaining Effective Teachers" (Paris: OECD Directorate for Education, 2003), available from www.oecd.org/edu.teacherpolicy; cited in OECD, *Teachers Matter* (see note 1), p. 180.

25. Ross and Hutchings, *Attracting, Developing and Retaining Effective Teachers* (see note 11), para. 343, p. 66.

26. OECD, *Teachers Matter* (see note 1), p. 195.

27. Ibid., p. 196.

28. Ibid., p. 194.

29. Ibid., p. 173.

30. OECD, *Teachers Matter* (see note 1), table 6.1A.

31. Alan Smithers and Pamela Robinson, *Teachers Leaving* (Buckingham, U.K.: Centre for Education and Employment Research, 2003), table 7.1, p. 49. Data are based on responses of teachers leaving schools for destinations other than teaching in another publicly supported school. The sample of 1,051 teachers excludes those leaving because they have reached normal retirement age or because of maternity.

32. Ibid., p. 63.

33. Anders Bjorklund and others, *The Market Comes to Sweden* (New York: Russell Sage Foundation, 2006), table 5.1, p. 63, and related discussion.

34. See OECD, *Teachers Matter* (see note 1), p. 176, for references to the relevant studies.

35. Ibid., chap. 6.

36. *International Outcomes of Learning in Mathematics Literacy and Problem Solving: PISA 2003 from the U.S. Perspective* (http://nces.ed.gov/surveys/pisa/PISA2003HighlightsFigures.asp?figure=9&quest=1). In addition, the United States scored below three non-OECD participating countries or areas—Hong Kong-China, Lichtenstein, and Macao-China—but above seven others.

37. A simple linear regression between test scores and salaries generates a slight negative and statistically insignificant coefficient. If the two outliers, Mexico and Korea, are omitted, the relationship is slightly positive but not statistically significant.

38. Trends in International Mathematics and Science Study: TIMMS 2003. Accessed from http://nces.ed.gov.timss/TIMSS)#Tables.asp?figure=6&Quest.

39. For an example of the complexities involved in explaining achievement differences across countries, see Thomas Fuchs and Ludger Woessman, "What Accounts for International Differences in Student Performance? A Re-examination Using PISA Data," Working Paper 1235 (Munich: CESifo, July 2004).

40. OECD, *Teachers Matter* (see note 1), table 4.1, p. 105.

41. Ibid., p. 105.

42. Gabor Halasz and others, *Attracting, Developing and Retaining Effective Teachers. Country Note: Germany* (Paris: OECD, September 2004), para. 47, p. 14.

43. Ibid., para 63, p. 19; and OECD, *Teachers Matter* (see note 1), p. 107.

44. OECD, *Teachers Matter* (see note 1), p. 108.

45. Ibid., p. 110.

46. Ibid., p. 109.

47. Ibid., p. 114.

48. Ibid., table 4.1 and discussion on p. 115.

49. Ibid., p. 84

50. S. Veenmann, "Perceived Problems of Beginning Teachers," *Review of Educational Research* 54 (1984): 143–78; and E. Britton, L. Paine, and S. Raizen, "Middle Grades Mathematics and Science Teacher Induction in Selected Countries: Preliminary Findings, National Center for Improving Science Education" (Washington: WestEd, 1999), cited in OECD, *Teachers Matter* (see note 1), p. 117.

51. OECD, *Teachers Matter* (see note 1), p. 21.

52. National Council on Teacher Quality, *Attracting, Developing and Retaining Effective Teachers: Background Report for the United States* (U.S. Department of Education, International Affairs Office, 2004), p. 37.

53. Scottish Executive Education Department, *Scottish Teacher Induction Scheme* (2005), www.scotland.gov.uk/publications.